

REMARKS

Claims 1 - 67 remain active in this application. Amendment of claims 1, 27, 55, 57 and 64 has been requested to emphasize novel and unobvious features of the invention. Support for the amendments of the claims is found throughout the application and claims as originally filed and, in particular, verbatim support for the amendatory language is found on page 21 (line 321) and page 23 (line 375). No new matter has been introduced into the application. The continued indication of allowability of claims 2, 3, 10, 15, 24, 28, 29, 41, 49, 50 - 52 and 65 - 67 is noted with appreciation.

It is respectfully noted for the record that the present action appears to be completely silent in regard to claim 9. Therefore, it is respectfully submitted that the present action is incomplete in regard to at least claim 9 and clarification of the status thereof in the next action is respectfully requested.

Claims 1, 4 - 8, 11 - 14, 16 - 23, 25 - 27, 30 - 34, 37 - 40, 42 - 48, 50, 51, and 55 - 64 have been rejected under 35 U.S.C. §102 as being anticipated by Jacobs. This sole ground of rejection is respectfully traversed for the reasons of record (including clear indications of impropriety thereof in the explicit language of the prior and present actions) and for the further reasons pointed out below.

Specifically, it was previously pointed out that the statement of the ground of rejection in the prior (and the present) action explicitly admits that Jacobs does not teach (or suggest) a central pattern generator in the statement that "Jacobs teaches multi-segmented robot having neurophysiological features similar to features found in actual biological systems which *being considered as a central pattern generator-based system*

for controlling ..." (sentence bridging pages 2 and 3 of the present action - emphasis added). In other words, the Examiner has explicitly admitted that Jacobs does not teach or suggest a central pattern generator and that the Examiner is (improperly) relying on one or more *unspecified* features having some *unspecified* similarity to biological systems "being considered as" the claimed central pattern generator when no central pattern generator is, in fact, disclosed or suggested by Jacobs. (It should be noted in this regard that, contrary to the Examiner's implications in this statement, the principal features of the apparatus of Jacobs which Jacobs discloses to largely mimic biological systems is the configuration of motors and mechanical connections which are said to model and resemble muscles and tendons while little, if any similar assertions are made in Jacobs in regard to modeling the development of control signals in a manner remotely analogous to biological systems.) This impropriety of the sole asserted ground of rejection is underscored in the present action by the Examiner's assertion that Jacobs teaches "processor equivalents" of claimed features of the present invention which, even if correctly asserted, is an explicit admission that Jacobs does not contain teachings which anticipate the claimed invention under 35 U.S.C. §102. It is respectfully submitted that the Examiner may have confused the concept of inherency which is permissible under very limited circumstances in a rejection for anticipation with the concept of equivalency which is only permissible under 35 U.S.C. §103 and, even then, is not dispositive of the issue of possible obviousness.

However, it is respectfully submitted that the processor-based arrangement of Jacobs is not at all an equivalent of the central pattern generator of the invention and that such an assertion as the Examiner

has made can only be reached by tortuous route of inference grounded in impermissible hindsight. As the Examiner is undoubtedly aware, a finding of equivalency must be based on a finding of close similarity between different arrangements at three points: specifically, different arrangements performing substantially *the same work* in substantially *the same way* to derive substantially *the same result*. While the goal/result of Jacobs (to develop robotic walking including responses to feedback signals) may be superficially similar to one possible application of the invention (to modify autonomously controlled repetitive motion, in general, such as for walking, flying, swimming and other modes of locomotion as well as for other repetitive actions such as breathing, the pumping action of the heart, peristaltic action, glandular secretion and the like, allowing application of the invention to prostheses and other medical purposes), the work of developing control signals and the way the control signals are developed are very different; giving rise to distinct differences in the *result* ultimately obtained as well as allowing the invention, by virtue of being based on a central pattern generator, *per se*, to provide numerous potential meritorious effects of which a processor-based system such as that of Jacobs, is inherently incapable.

Specifically, a central pattern generator, by definition and the name, itself, generates a *pattern* of control signals which is rhythmic and largely repetitive although, in accordance with the invention, various parameters of the signals (e.g. amplitude, phase, wave shape and the like) and the pattern thereof (e.g. frequency, rate of change of parameters and the like) may be "adapted as a function of sensory feedback" (claim 1) and does so "autonomously" (e.g. without specific external controls for generation of particular signals). This allows the central pattern

generator to operate without any data processing to provide control of particular motions or activities while those motions or activities may be adapted *directly* in accordance with sensory feedback since a central *pattern generator*, by its nature (and nomenclature), autonomously generates a *pattern* of control signals sufficient to the performance of an overall activity rather than processing individual controls which may or may not be sufficient to achieve such an activity. By the same token, a central pattern generator, by avoiding a need for processing individual commands and essentially embodying simple differential equations such as that noted on page 25 where the parameters thereof can have direct analogs in physical circuits which closely mimic biological systems, can be made very simple, small and inexpensive, of low power consumption, and much more readily adaptable to a very wide variety of applications, as discussed in the specification and including such diverse applications as toys, robotics, prosthetics and medical aids and other benefits of being more compatible with biological systems. None of these meritorious effects can be approached with a processor or computer based system which primarily generate controls for individual events rather than a pattern corresponding to an overall process or activity.

These differences from Jacobs in the work performed, the way it is performed and the *results* derived may possibly be most readily appreciated from the discussion at columns 12 - 14 of Jacobs. Beginning at line 35 of column 12, Jacobs recites:

"A mobility pattern, such as walking, running, bending or grasping may be defined as a sequence of mobility phases. Each phase may be further defined as a sequence of mobility events."

The last sentence of that paragraph further refers to

Figure 10 as a "state diagram". This state diagram is further refined in Figure 13 which is also clearly a state diagram and described in columns 15 and 16. From these figures and the description thereof, the cyclic actions and conditions of walking are clearly developed as distinct events corresponding to distinct controls of particular functional muscle groups (FMGs) which must be completed prior to development of the commands for the next "event" in the cycle by which walking is performed. Therefore, it is clear that the computer-based system of Jacobs does not provide a "central pattern generator", much less autonomously generating a pattern of commands which may be adapted based on feedback but only generates controls for individual "events" which may be individually modified and which may be performed in a sequence but which do not constitute a pattern of autonomously generated commands. Accordingly, the work done, the way in which it is done and the result achieved are, in fact, very different as between the invention, as claimed, and Jacobs and the only similarity between them appears to be discernible only through hindsight while ignoring the express terms of the claims referring to a central pattern generator *per se* which supports the meritorious effects of simplicity, adaptability, low cost, small size, low power and the like not at all available from a computer-based system which must process individual events and then link them into a sequence rather than producing a pattern of commands from the outset. It thus follows that Jacobs is not properly considered as a central pattern generator or an equivalent thereof and there is no basis even for asserting inherency of pattern generation in Jacobs. The Examiner has thus failed to make a *prima facie* demonstration of anticipation (or obviousness) of any claim.

Moreover, the dependent claims are clearly distinguished from Jacobs by virtue of the recitations

respectively contained therein as well as for the reason discussed above. For example, it is respectfully submitted that the computer-based system of Jacobs cannot be considered to include neurons, synapses or the like or their analogues as recited in various combinations in numerous dependent claims. There is no teaching or suggestion in Jacobs of combining a non-biological central pattern generator with a biological system as recited in, for example, claims 19 and 21. Further, in regard to a number of claims such as claims 6 and 32, the Examiner asserts that particular structure in Jacobs which is respectfully submitted to be distinct from that claimed is "considered as being" that which is claimed; a rationale completely inappropriate to a rejection for anticipation and which inherently admits the impropriety thereof. Therefore, it is clearly seen that Jacobs does not support rejection of dependent claims even in regard to the recitations respectively contained therein, much less in combination with the subject matter of claims from which they variously depend.

Accordingly, it is respectfully submitted that the sole ground of rejection is clearly in error and admittedly so by the explicit language of the present action and thus clearly untenable. Further, to emphasize the point at which the Examiner is most clearly in error, amendment of claims 1, 27, 55, 57 and 64 has been requested to more fully recite the function of a central pattern generator and thus to more fully define the nature thereof in the claim beyond the definition explicitly and necessarily provided by the nomenclature of the "central pattern generator". Accordingly, it is respectfully submitted that, upon entry of the above-requested amendment, the sole asserted ground of rejection is even more clearly in error and untenable. Accordingly, reconsideration and

withdrawal of the grounds of rejection of record are respectfully requested.

It is also respectfully submitted that the finality of the present action is premature and should be withdrawn to allow the above-requested amendments to be entered as a matter of right. No action that is incomplete (e.g. by omission of mention of claim 9) can properly be made final and, moreover, it is axiomatic that no action should be made final which does not *prima facie* establish the propriety of the grounds of rejection contained therein. In the present action, the Examiner has not only failed to do so but has repeated an admission of the *impropriety* of the sole ground of rejection and underscored that admission by answering arguments previously made by an (erroneous) assertion of equivalency inappropriate to a rejection for anticipation under 35 U.S.C. §102. Accordingly, the present action is respectfully submitted to be incomplete and insufficient to *prima facie* demonstrate that any claim contained in this application is unpatentable under any statutory authority and thus the finality of the action is clearly premature and should be withdrawn. Therefore, it is respectfully submitted that withdrawal of the finality of the present action and entry of the above-requested amendments as a matter of right is clearly in order.

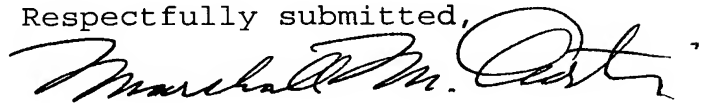
In any event, it is also respectfully submitted that the entry of the above-requested amendments is well-justified. The amendments made reflect language of other claims and are directed to functions of a central pattern generator consistent with its nomenclature as used in the claims as currently rejected and which were clearly at issue at the time of the present action. Therefore, it is respectfully submitted that the above-requested amendments cannot raise any new issue but, rather, are respectfully submitted to place the application in condition for

immediate allowance. Further, since the amendments are directed to clarification of the function of the recited central pattern generator, the amendments also serve to reduce potential issues for Appeal. Accordingly, entry of the above-requested amendments is respectfully submitted to be well-justified whether or not the finality of the present action is withdrawn and such action is respectfully requested.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered and shown to be in error and/or inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 C.F.R. §1.111(b) and such reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

A petition for a three-month extension of time has been made above. If any further extension of time is available and required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



Marshall M. Curtis
Reg. No. 33,138

Whitham, Curtis & Christofferson, P. C.
11491 Sunset Hills Road, Suite 340
Reston, Virginia 20190

(703) 787-9400
Customer Number: 30743